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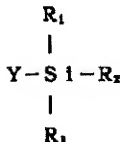
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(54) RESIN COMPOSITION

(57)Abstract:

PURPOSE: To obtain a resin composition having excellent crack resistance in soldering and moisture resistance by blending mainly a modified reactional product obtained by reacting a specified polymaleimide with a silane coupling agent.

CONSTITUTION: This resin composition is manufactured by modifying (A) a polymaleimide containing ≥ 2 maleimide groups in one molecule (e.g. N,N'-ethylenebismaleimide) by reacting 100 pts.wt. of (A) with 0.1-25 pts.wt. of (B) a silane coupling agent of the formula (Y is univalent organic acid containing amino group; R₁ to R₃ are H, phenyl, OR (R is H or 1-5C alkyl), etc.; at least one of R₁ to R₃ is OR) (e.g. 3-aminopropyltrimethoxysilane) and blending the modified product with an epoxy resin containing ≥ 2 epoxy groups in one molecule and a hardener. Optionally the component A is mixed with a phenol resin, in advance.



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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

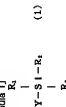
3.in the drawings, any words are not translated.

CLAIMS

[Claim 1]

[Claim 1] A polyamide compound and a general formula (1) which have two or more maleimide groups in one molecule [Claim 1]

[Chemical formula 1]



[An organic group of monovalence in which Y contains an amino group among a formula, R₁, R₂, and R₃ A hydrogen atom, a phenyl group, an alkyl group of the carbon numbers 1-6, Or a thermosetting resin composition which contains as a subject a reaction-of-degeneration thing to which are OR group (R shows an alkyl group of a hydrogen atom or the carbon numbers 1-5), and at least one of R₁, R₂, and the R₃ connects to carry out the reaction of degeneration of the silane coupling agent expressed with] which is -OR group.

[Claim 2] The thermosetting resin composition according to claim 1 which made a polyamide compound contain phenol resin beforehand.

[Claim 3] A resin composite by which an epoxy resin which has at least two epoxy groups being included in the thermosetting resin composition according to claim 1 or 2 and one molecule.

[Claim 4] A resin composite for semiconductor closure which contains the resin composite according to claim 1, 2, or 3 as a subject.

[Claim 5] A resin composite for semiconductor closure which contains a resin composite according to claim 1, 2, or 3 and an inorganic bulking agent as a subject.

[Translation done.]

triethoxyborate, the 1,8-diaz-bisphile (5, 4, 0) undecane 7 and its derivative are mentioned. These hardening accelerators may be used independently, may use two or more kinds together, and can also use organic peroxide and an azo compound together if needed. The content of these hardening accelerators is used in the range of 0.01 to 10 weight section to thermosetting resin 100 weight section which makes a reaction-of-degeneration thing a subject.

[0016]The resin composite of this invention if needed besides the various above-mentioned ingredients Diethyl phthalate, Reactive diluent; several-kinds silicone oil generally used to inside resin, such as triethyl isocyanurate and α,ω -dialkylbisphenol A; Fatty acid, Fire retardant, such as mold lubricant, bromine compounds, such as fatty acid salt and a wax, antimony, and a phosphorus, colorant, such as carbon black, etc. can be blended, and it can mix and null, and can be considered as a molding material.

[0017]

[Working example] Hereafter, an embodiment explains this invention concretely. In an embodiment, the test method of the performance of a constituent is as follows.

- glass-transition-temperature: — TMA method and bending strength: — JIS K-6911 and solder immersion test: — Immediately after neglecting 25 semiconductor devices for an examination to 85 °* and 85% of constant temperature/humidity chamber for 168 hours, it is immersed in a 260 °* molten solder bath for 10 seconds.

Then, the number of the semiconductor devices which the crack generated in package resin was counted.

The damp-proof test after solder immersion: In a solder immersion test, a crack the semiconductor device for an examination by which it was not generated - 121 °* It is neglected in a 2-atmosphere pressure cooker tester, electrical continuity is checked for every fixed time, and the poor incidence rate by the corrosion of aluminum wiring measures time to reach to 50%.

[0018]Example A-G of manufacture (manufacture of reaction-of-degeneration thing A-G)
The polymaleimide compound was inserted in the reaction vessel equipped with an agitator, a thermometer, and a condenser. It warmed at 160 °*, the silane coupling agent was inserted so that it might become the presentation of A-G of the 1st table, and you made it react for 3 minutes. It cooled immediately, and reaction-of-degeneration thing A-G was obtained.

[0019]Example H-K of manufacture (manufacture of reaction-of-degeneration thing H-K)
A polymaleimide compound and phenol resin are inserted in the reaction vessel equipped with an agitator, a thermometer, and a condenser, and it warms at 160 °*, and is the 1st table. The silane coupling agent was inserted so that it might become the presentation of H-K of Table 1, and you made it react for 5 minutes. It cooled immediately, and reaction-of-degeneration thing A-G was obtained.

[0020]

[Table 1]

第1表

実施例番号	ポリマレイミド化合物 (重量部)	シリコンカップ リング剤 (重量部)	ノボラック型フェノール樹脂 (重量部)
A	ポリマレイミド化合物 (1) 100	KBM6035	5
B	ポリマレイミド化合物 (1) 100	KBM6025	5
C	ポリマレイミド化合物 (1) 100	SZ-60835	5
D	ポリマレイミド化合物 (1) 100	A-1875	5
E	ポリマレイミド化合物 (2) 100	KBM6035	5
F	ポリマレイミド化合物 (2) 100	SZ-60835	5
G	ポリマレイミド化合物 (2) 100	A-1875	5
H	ポリマレイミド化合物 (1) 100	KBM6035	20.7
I	ポリマレイミド化合物 (1) 100	SZ-60835	20.7
J	ポリマレイミド化合物 (2) 100	KBM6035	20.7
K	ポリマレイミド化合物 (2) 100	SZ-60835	20.7

[0021]Embodiments 1-9 and the comparative example 1 - the 8 2nd table The compound of the presentation (weight section) shown in [Table 2] was mixed with the Henschel mixer, and melting and the null of were done for 3 minutes with a further 100-130 °* hot calendar roll. This mixture was cooled and ground, was tableted and the molding resin composition was obtained. The following were used for the raw material used all over the 1st and 2nd table.

- Polymaleimide compound (1): bis(4-maleimide phenyl)methane (product made from Mitsui Toatsu Chemicals Chemistry)
- Polymaleimide compound (2): 4,4'-bis(3-maleimide phenoxy)BFU ENRU (made by Mitsui Toatsu Chemicals, Inc.)
- Epoxy resin, α -cresol novolak type epoxy resin (ECON-1020, Nippon Kayaku Co., Ltd. make)
- Bromine-ized epoxy resin, bromine-ized phenol novolak type epoxy resin (BREN -S, Nippon Kayaku Co., Ltd. make)
- Hardening agent; novolak type phenol resin (PN-80, Nippon Kayaku Co., Ltd. make)
- Inorganic bulking agent (1): globular form fused silica with a mean particle diameter of 20 micro (Hori Miki S-CO, Micron Miki)
- Inorganic bulking agent (2): infibito form fused silica with a mean particle diameter of 13 micro (made in Russ REDX RD-8 T axon)
- Silane coupling agent; 3-(γ -aminopropyl) trimethoxysilane (KBM603, Shin-Etsu Chemical Co., Ltd. make)
- Silane coupling agent; 3-(γ -aminoethoxy) propyl dimethoxysilane (KBM602, Shin-Etsu Chemical Co., Ltd. make)

